

CLAIMS

1. A method of transforming energy in a rotary screw machine (Fig. 1a), which comprises:  
5 a first set of conjugated male and female elements (5, 6, 7; 15, 16, 17) and  
at least a second set of conjugated male and female elements (8, 9; 5', 6', 7'; 15', 16', 17'), spaced apart from said first set (1) along  
10 a central axis of said machine,  
wherein said female elements (5, 6, 15, 16; 8; 5', 6', 15', 16') of each set have an inner profiled surface (105, 106, 115, 116; 108; 105', 106', 115', 116') centered about a first longitudinal axis (Z) and  
15 - wherein said male elements (6, 7, 16, 17; 9; 6', 7', 16', 17') of each set (1, 2, 3) have an outer profiled surface (206, 207, 216, 217; 209; 206', 207', 216', 217') centred about a second longitudinal axis,  
- said first and second axis being parallel to each other,  
20 and  
- said male elements being placed in a cavity of the corresponding female elements,  
- wherein upon rotary motion of the male and/or female elements,  
25 working chambers which are formed between the female and male elements perform an axial movement, and  
- wherein the rotary motions of the different sets (1, 2, 3) are synchronized in such a manner that synchronous and inphase motion of the elements in different sets (1, 2, 3) is performed with  
30 different values of angular periods of oscillation of axial movement of said working chambers.
2. The method of claim 1, wherein the angular period decreases from one set to the next set, thereby having the working medium  
35 compressed.

3. The method of claim 1, wherein the angular period increases from one set to the next set, thereby having the working medium expanded.
- 5 4. The method of any of the proceeding claims, using a hollow shaft (4) and the working medium passing therethrough as a means for synchronizing the rotary motions of the different sets (1, 2, 3).
- 10 5. The method of any of the proceeding claims,  
wherein a first set (1) forms a differential kinematic mechanism having three degrees of freedom of a mechanical rotation of which two degrees of freedom are independent, and  
wherein a second set (2) forms a planetary kinematic mechanism, having two degrees of freedom of a mechanical rotation, of which  
15 one degree of freedom is independent.
6. The method of any of the proceeding claims, wherein thermal energy of the working medium is removed and supplied in a heat exchanger.
- 20 7. The method of any of the proceeding claims, wherein mechanical energy produced in one of said sets is used to drive another device.